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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/673,204	Applicant(s) STURM ET AL.	
	Examiner Michael Cleveland	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-21,23-31 and 36-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-21 and 23-27 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-10,28-31 and 36-40 is/are rejected.
- 7) ☒ Claim(s) 11-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5-7, 9, 28-31, and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Shirasaki et al. (U.S. Patent 5,895,692, hereafter '692).

Claims 1-3, 5-7, 28-31, 36, 41: '692 teaches a method of making an organic light-emitting device (col. 1, lines 1-15)

providing a substrate (11);

coating an organic material (16) on the substrate (col. 4, lines 41-60; Figs. 6A-6B); and

applying fluorescent dyes (i.e., dopants) (13a-c) dissolved in a solvent (col. 7, lines 21-23) in selected areas to modify the color (i.e., the light-emitting properties) of the film (col. 4, line 61-col. 5, line 8; Figs. 7A-8B);

and causing the dopant to migrate into the organic coating (col. 7, lines 15-36).

'692 does not explicitly teach that a solvent from the ink jet or screen printing inks causes the dopant to diffuse into the organic material. '692 teaches the same organic material (polyvinylcarbazole) described in Applicant's specification, and the same dyes (coumarins) disclosed by Applicant, applied in the same form (dissolved in a liquid) as Applicant. Therefore, it appears that the same phenomenon of diffusion must have occurred in the case of Shirasaki '692 as did in the case of Applicant or else such diffusion is caused by essential features which are not present in the claims. Furthermore, '692 teaches that diffusion may occur while the pigments are in the form R', G', and B' as pigments dissolved in the solvent (col. 7, lines 15-30; col. 9, lines 21-23). Therefore, Shirasaki teaches diffusion while the solvent is present.

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Claims 2-3, 30-31: The dye may be applied by ink-jet printing (col. 7, lines 15-24).

Claim 5: The dyes may be applied by screen printing (col. 7, lines 15-24).

Claims 6-7: The inks may be red, green, or blue dyes (col. 5, lines 1-8).

Claim 29: The dopant is applied in a pattern and the dopant forms the same pattern after migrating into the organic layer (Figs. 7A-8B; col. 7, lines 15-36).

Claim 36: The dyes may be applied by screen printing (col. 7, lines 15-24). Screen printing involves depositing a patterned mask on the surface to be printed (in this case, organic layer (16)), applying the printing ink (in this case, containing the dopant) over the mask and the printing surface. The dyes are then caused to migrate into the organic film in the printed pattern (i.e., in the areas exposed through the screen) (col. 7, lines 15-36; Figs. 7A-8B).

Claim 41: Electrodes (12) and (15) are provided above and below the organic host material to form an organic light emitting device (col. 4, lines 41-52).

Claim 9: '692 teaches a method of manufacturing an organic device comprising:

providing a substrate,

providing a first electrode disposed on the substrate;

applying an organic coating having a solvent (i.e., a dopant) over the first electrode; and

drying the coating (i.e., removing the solvent (i.e., the dopant) from areas of the coating to leave undoped areas; and

depositing a second electrode over the organic coating (col. 1, lines 41-67).

3. Claims 1, 6, 9-10, and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Antoniadis et al. (U.S. Patent 5,719,467, hereafter '467).

Claims 1 and 28: '467 teaches a method of making an organic light-emitting device (col. 1, lines 1-15)

providing a substrate;

providing a first electrode disposed on the substrate (col. 7, lines 48-51; col. 6, lines 39-41);

providing an organic host material (PANI:CSA) disposed over the first electrode (col. 7, lines 48-51);

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applying a dopant dissolved in a solvent onto the organic host material, such that the solvent causes the dopant to diffuse into the organic host material (col. 7, lines 51-56); and

Claim 6: Such treatment modifies the light-emitting properties of the organic host material (Compare Examples 2 and 7).

Claim 29: The dopant replaces polyester in a pattern (i.e., over the entire coating).

Claim 9: '467 teaches a method of manufacturing an organic device comprising:

providing a substrate,

providing a first electrode disposed on the substrate (col. 7, lines 34-37; col. 6, lines 39-41);

applying an organic coating (PANI:CSA) having a dopant (polyester) over the first electrode (col. 7, lines 34-37);

removing the dopant from areas of the coating to leave undoped areas (col. 7, lines 37-38); and

depositing a second electrode over the organic coating (Fig. 2; col. 7, lines 39-43).

Claim 10: The removal occurs by applying xylene in a pattern (i.e., over the entire substrate).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 as applied to claim 7, above, and further in view of Tamano et al. (U.S. Patent 6,150,042, hereafter '042).

'692 is described above. It teaches that the dopant may be coumarin (col. 5, lines 1-8), but does not also teach the use of Nile red.

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'042 teaches a number of materials for use as dopants in EL devices. The list (col. 77, line 19-col. 78, line 3) significantly overlaps that of '692, and includes nile red (col. 77, line 66). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used nile red in addition to coumarin as the dopants of '692 with a reasonable expectation of success because '042 teaches that nile red is a dopant suitable for EL devices.

6. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 as applied to claim 1, above, and further in view of Yuh et al. (U.S. Patent 5,521,047, hereafter '047).

'692 is described above. '692 teaches that the inks are fluorescent inks such as perylene. '692 is silent as to the identity of the solvents. Yuh '047 teaches that solvents such as acetone and tetrachloroethylene (TCE) are useful solvents for solutions (i.e. inks) containing fluorescent pigments such as perylenes (col. 2, lines 27-45). The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a solvent such as acetone or TCE as the particular ink solvent of '692 with a reasonable expectation of success because '047 teaches that they are useful solvents for carrying such pigments.

Claims 38, 40: '692 teaches that the receiving material is polyvinylcarbazole (col. 4, lines 55-60).

7. Claims 2-3, 5, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '467 as applied to claims 1 and 28, above, and further in view of Yamazaki (U.S. Patent 5,538,548, hereafter '548).

'467 is described above, but does not explicitly teach delivering the ink containing xylene and TPD by screen printing or ink-jet printing. However, the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '548 teaches that screen printing and ink-jet printing are operative methods of

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delivering xylene to substrates (col. 1, lines 24-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have delivered the ink of '467, Example 7, to the organic layer by ink-jet printing or screen printing because '548 teaches that such are suitable methods of depositing xylene-containing inks.

8. Claims 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '467 as applied to claim 1, above, and further in view of Honjo et al. (U.S. Patent 4,218,362, hereafter '362).

'467 is described above, but does not explicitly teach that the ink contains acetone or trichloroethylene (TCE). '467 teaches that the ink solvent should dissolve the polyester (col. 5, lines 53-63). The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '362 teaches that acetone and TCE are operative solvents for polyesters (col. 6, lines 51-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used acetone or TCE as the solvent of '467 because '362 teaches that such are suitable solvents for polyester.

9. Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Chang et al. (*Appl. Phys. Lett.*, **73**, pp. 2561-2563, hereafter "Chang").

'692 is discussed above but does not explicitly state that the solvent causes the pigment to diffuse into the polymer. Chang teaches that dyes may be diffused into layers for light-emitting pixels by dissolving them in solvents that dissolve the underlying layer (p. 2562, col. 2, lines 21-27; p. 2563, col. 1, lines 27-33) to enhance the adhesion of the dye to the underlying layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have caused the dye of '692 to have diffused into the underlying layer by using a solvent that dissolves the underlying layer in order to have enhanced the adhesion of the dye to the underlying layer.

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10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Chang as applied to claims 5 and 36, above, and further in view of Tamano '042 for substantially the same reasons discussed regarding claim 8, above.

11. Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Hebner et al. (*Appl. Phys. Lett.*, **73**, pp. 1775-1777, hereafter "Hebner").

'692 is discussed above but does not explicitly state that the solvent causes the pigment to diffuse into the polymer. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Hebner teaches that dyes may be diffused into layers for light-emitting pixels by dissolving them in solvents that dissolve the underlying layer (p. 1775). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have caused the dye of '692 to have diffused into the underlying layer by using a solvent that dissolves the underlying layer with a reasonable expectation of success because Hebner teaches that such is an operative method of diffusing the dye into the underlying layer.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Hebner as applied to claims 5 and 36, above, and further in view of Tamano '042 for substantially the same reasons discussed regarding claim 8, above.

Allowable Subject Matter

13. Claims 15-18 are allowed for the reasons already of record. Claims 19-21 and 23-27 are allowed for similar reasons to those given regarding claim 15 in the Office Action mailed 8/29/2003: The prior art does not fairly teach or suggest providing a first electrode over a substrate, providing a first layer of material, applying a dopant in a pattern so that the first layer contains the dopant, providing an organic second layer and transferring the dopant from the first layer to the second layer, wherein the organic second layer is deposited on the first electrode and a second electrode is deposited over the second layer.

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14. Claims 11 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable for the reasons already of record if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 12 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims because Antoniadis '467 does not fairly teach or suggest that the solvent is applied in a pattern that does not include the entire area of the coating (as required by claim 14) nor patterning a mask on the coating prior to applying the solvent to remove the dopant in a pattern (as required by claim 12).

Response to Arguments

16. Applicant's arguments filed 4/20/2004 have been fully considered but they are not persuasive.

The rejections under 35 USC 102 and 35 USC 103 based on Morris '451, Kaszczuk '444, Kim '746, and Nojiri '111 have been overcome by Applicant's amendments.

35 USC 102 and 103:

Claims 1-3, 5-8, 28-31, and 36-40: Applicant argues that '692 does not disclose that a solvent from the ink jet or screen printing inks causes the dopant to diffuse into the organic material. '692 teaches the same organic material (polyvinylcarbazole) described in Applicant's specification, and the same dyes (coumarins) disclosed by Applicant, applied in the same form (dissolved in a liquid) as Applicant. Therefore, it appears that the same phenomenon of diffusion, to at least some extent, must have occurred in the case of Shirasaki '692 as did in the case of Applicant. Applicant has provided no scientific reasoning to contradict this assertion.

Applicant argues that Shirasaki teaches that "fluorescent pigment applied with a solvent will 'dry' and is only subsequently 'diffused' into the organic layer after the solvent is 'dried.'" Shirasaki, col. 9, lines 13-23. The argument is unconvincing because the teaching of '692 are not so limited. Col. 7, lines 15-30 indicate that fluorescent pigments R', G', and B' may be present at the time of energization and that R', G', and B' are pigments dissolved in the solvent. Therefore, Shirasaki teaches diffusion while the solvent is present. Applicant argues that the

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word 'liquid' at col. 7, line 28 is used to describe the surface to which the pigment was previously applied. The argument is incorrect because col. 7, lines 28-29 teaches "liquid fluorescent materials R', G', and B'" and therefore explicitly states that R', G', and B' are the liquids to which reference is made. Col. 7, lines 18-20 indicate that the R', G', and B' are pigments R, B, and G dissolved in solvents, further clarifying that these are liquids. See also col. 9, lines 21-23 which indicate that materials R', G', or B' may be diffused. While Applicant stresses that Shirasaki requires the use of heat or other energy to cause diffusion, the statement is not relevant to the claims, which do not exclude the use of heat or other energy. The Examiner further notes that, in each of Applicant's examples, ultraviolet energy is applied to the substrate before the diffusion was detected.


Claims 9: Applicant argues that col. 1, lines 41-67 teaches that the solvent is removed but not the dopant. The argument is unconvincing because Applicant's claim 9 does not exclude the possibility that the dopant of claim 9 is a solvent.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Tuesday-Friday and alternate Mon, 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Michael Cleveland
Patent Examiner
July 9, 2004